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AUTHOR	Wiener, Morton; Cromer, Ward
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ABSTRACT

The applicability of a proposed category system for identifying different types of poor readers in grade 7 was investigated. Three variables were used: vocabulary level, degree of consensual response to meaning, and response to organization when it was added to the reading material. Systematically combining the three levels of response produced eight categories of subjects who showed reading comprehension difficulty. The eight categories were (1) overall reading skill deficient; (2) language deficient; (3) idiosyncratic responder; (4) nonorganizer; (5) language deficient and nonorganizer; (6) idiosyncratic responder and nonorganizer; (7) skill deficient, language deficient, and nonorganizer; and (8) no apparent difficulty. The model was applied to selected and matched good and poor readers, and 40 of the 48 subjects could be categorized adequately. Two subsidiary studies, involving 26 boys and 22 girls representing good and poor readers in grade 5, were also reported. Results indicated that nonorganization of the language input contributed to comprehension difficulties of poor readers. Contextual information did not aid poor readers, while good readers used this information to correct identification errors. Tables and references are included. (WB/Author)

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Development of New Techniques to Identify Types of Reading Difficulties

Morton Wiener and Ward Cromer

Clark University
Worcester, Mass.

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Summary

This report was a first exploration of the applicability of a proposed category system for identifying different types of poor readers (in the seventh grade). Using three variables - vocabulary level, degree of consensual responding to meaning, and the response to organization (that is, chunking) when it is added to the reading material - and systematically combining these three levels of response leads to eight possible categorizations of subjects who show reading comprehension difficulty. The eight categories are: (1) overall reading skill deficit; (2) language deficit; (3) idiosyncratic responders; (4) non-organizers; (5) language deficit and non-organization; (6) idiosyncratic responders and non-organizers; (7) skill deficit, language deficit and non-organizers; (8) no apparent difficulty. The model was applied to carefully selected and matched good and poor readers and 40 of the 48 subjects (seventh graders) could be categorized adequately.

In that the defining criteria for designating poor readers in the project was reading comprehension, and since the category system as derived included no systematic index of identification competence, it seemed important to explore further the relationship between reading comprehension and identification, while simultaneously investigating the role of linguistic organization in comprehension and in identification. In this context, two subsidiary studies were carried out as part of the project.

The first of the subsidiary studies attempted to determine the relationship of word identification skill, language organization, and reading comprehension for carefully matched good and poor readers (fifth grade) when material was presented visually and auditorily, under conditions where the subject had material parallelling the assumed "input" of good and poor readers. Even with good identification possibilities, poor readers did not show an increase in comprehension. Further, poor readers showed less comprehension of spoken material when it was non-organized than did good readers. The results also failed to support the assumption that good identification is a sufficient condition for good comprehension and more importantly suggest that a significant amount of the comprehension difficulties of the poor readers may be attributable to non-organization of the input. In the second study, the effect of comprehension training (providing contextual information) on identification ("saying" of the words) was investigated. Again, identification of carefully matched good and poor readers (fifth grade) was compared under paragraph versus single word and with information about the meaning of the text versus no comprehension information. Results indicated that contextual information did not aid the identification of poor readers, while good readers used this information to correct identification errors.

The overall findings, then, point to the possibilities and limits of the proposed category model and once again shows the importance of considering the role of organization in reading for relatively "advanced" readers, while suggesting that identification difficulties are of less importance for this level reader. While the studies reported here focused on whether good and poor readers used organization when it is made available, future work will attempt to determine under what conditions organization is imposed on graphic and auditory material by what kinds of poor readers.

Application of a Category System to Identify Types of Reading Difficulties in Seventh Grade Readers

Since one purpose of this project, and this study in particular, is to determine whether or not several distinct kinds of poor readers with comprehension difficulties could be identified, the first task was to locate groups of good and poor readers at the seventh grade level who were comparable to those studies previously (students at the junior college level). If the four groups (good and poor readers, high and low vocabulary) could be located, then they could be studied to see if they respond in ways similar to the groups of poor readers studied earlier, that is, students in the fifth grade and at junior college levels. If the tasks used could be shown to distinguish individuals within the groups of good and poor readers, a final purpose of this study was to attempt to try to specify particular types of poor readers as well.

A set of categories was proposed. These categories systematically attempted to include all of the logical possibilities of patterns or clusters of each result for any subject on the various tests to be administered. Each of these patterns or categories posited theoretically exemplifies a different type of reading difficulty. The question, then, is whether or not individuals can be assigned reliably to these categories, given the information available on each of them.

Method

1. Subjects

Forty-eight subject taken from thirty-three boys and twenty-three girls in the seventh grade in a New England public school system were divided into four matched groups. The groupings were based on Vocabulary and Reading Comprehension scores on the Iowa Tests of Basic Skills (the test given routinely to all students in the school system where the subjects were obtained). See Table 1.

Group One had low vocabulary and low reading comprehension scores. Low vocabulary was defined as scoring with a grade equivalent of 6.2 or below. Low reading was defined as scoring with a grade equivalent of 6.1 or below. For this group, the mean vocabulary score was 5.4 and the mean reading comprehension score was 5.4.

Group Two had high vocabulary and low reading comprehension scores. High vocabulary was defined as a grade equivalent score of 6.7 or above on the vocabulary subtest, while low reading again was defined as a score of 6.1 or below. The mean vocabulary score was 7.5 and the mean reading score was 5.5.

Group Three had low vocabulary and high reading comprehension scores. High reading comprehension was defined as scoring with a grade equivalent of 6.9 or above for this group. The mean vocabulary score for Group Three was 5.9 and the mean reading comprehension score was 7.5.

Group Four had both high vocabulary and high reading comprehension scores. Vocabulary scores were 6.7 or above and reading scores were 7.1 or above.

Table 1

Vocabulary, Reading Comprehension, and Intelligence Scores for Each Group of Subjects

Subjects	Vocabulary		Reading Comprehension		IQ	
	mean	range	mean	range	mean	range
Group One LV - LR	5.4	3.6-6.2	5.4	4.4-6.0	95.6	90-104
Group Two HV - LR	7.5	6.8-8.4	5.5	3.4-6.1	102.0	96-112
Group Three LV - HR	5.9	5.3-6.2	7.5	6.9-8.0	100.0	92-112
Group Four HV - HR	7.5	7.0-8.3	7.7	7.1-8.7	99.4	90-110

The mean vocabulary score for this group was 7.5 and the mean reading score was 7.7.

General characteristics of the four groups of subjects, including their vocabulary, reading comprehension, and IQ scores, are shown in Table 1.

II. General Procedure

All subjects were tested during school hours. All subjects were tested by the same experimenter and were seen individually for a single session which, depending on the pace of the individual, lasted from 30 to 70 minutes.

Efforts were made to put each of the children at ease by trying to be informal and by telling each child that his performance on the tests had nothing to do with his grades or with his school work. The children were told that there were things the experimenter wanted them to do "to find out how kids in the seventh grade do on them, and to see if some of the things are too hard for kids in your grade." After dealing with any questions the subject might raise, the experiment was begin.

The five separate parts of the experiment all were presented in the same order and sequence for each subject. The five sections will be discussed separately below.

A. Word Association Task.

1. Materials

The stimuli were a list of seven words taken from the Kent and Rosanoff (1910-1911) listing of word associations for normal subjects. These words were first used in an earlier study (Cromer and Wiener, 1966) and were selected because each fit the following three criteria: (1) It had at least three associations which occurred with a frequency of over 100 (and therefore a number of high frequency associations were possible for each word); (2) It appeared to be affectively non-threatening in content; and (3) It seemed within the range of difficulty of children in the fifth grade (the group used in the earlier study).

The stimulus words selected for the word association task were the following: black, chair, short, cold, foot, bread, thirsty.

2. Procedure

All of the stimulus words were presented orally and the responses were tape recorded. The following instructions were given:

> I have some words that I am going to say to you. What I want you to do is to give me the first thing you think of when I say the word. Just give me the very first word that comes into your head and say it as quickly as you can. O.K.? Let's try one.

The subjects were allowed as much time as was necessary to give their associations. Order and sequence of presentations were randomly determined.

B. Cloze Task

1. Materials

The stimuli were stories taken from a fourth grade reader, each of which described a neutral activity in which a young boy was taking part. In each of the stories, words were randomly removed and blanks left in their place. These stories were identical to those used in an earlier study (Cromer and Wiener, 1966).

The first paragraph of each of the stories is presented below:

Story One: I live in the country_____ my hobby is my garden. _____ have collected almost _____ different kinds of plants.

Story Two: My parents are not home this evening as they went _____ after supper. I _____ the dishes and am sitting _____ the front _____ of the farmhouse, waiting for my _____ to return.

Each story had a total of 19 blanks to be filled in by the subject.

2. Procedure

The two stories were presented under different conditions. For the first story, the experimenter instructed the subject to read the story aloud and fill in the blanks, while for the second story the experimenter read the story aloud and the subject only had to fill in the blanks. The instructions were as follows:

First Story: Here is a story with some words missing. You are to read the story aloud and fill in the blanks with a word you think might fit. I'll follow along and help you if you need it.

Second Story: This time you can follow along while I read the story. All you have to do is to guess a word when we come to a blank.

Order of presentation of the two stories was alternated, but the first story always was read aloud by the subject and the second by the experimenter.

C. Regular Stories/ past and present tense

1. Materials

The stimuli were the two stories originally used by Cromer and Wiener (1966) which best differentiated good and poor readers in terms of their differential effects on these two groups.

The two stories selected each described two boys involved in aggressive behaviors, that is, they described two boys fighting with each other. One of the stories is written in the first-person present tense, with the action taking place in a temporally present context in a setting much like that in which the subjects were currently living. In the other, the story is written in the third-person past tense, with the action taking place in a distant and unfamiliar setting. Both stories were equated for the following: number of lines; number of words; and number ot nouns, prepositions, articles, adjectives, adverbs, conjunctions and verbs. The stories were matched in word difficulty as measured on the Thorndike-Lorge (1952) word list.

Each story was preceded by an introduction which set the action in time and space ("At this very time, in this very town of Shrewsbury, not very far from where you are now, is a young boy named Harry," versus "Many, many years ago way back in the Middle Ages around 1423, during the time of kings and knights and castles, there lived a young boy named Owen."). The stories were typed on 9 x 6 inch cards and presented to the subject one at a time with the simple instruction to "read this story aloud."

D. Identification/Comprehension Tests: Three Modes

1. Materials

The stimuli, a series of stories, were adapted from materials on the Davis Reading Test, Series 1, the California Reading Test, and the Sequential Tests of Educational Progress. Three sets of three stories each were selected such that each of the three stories in each set were comparable in difficulty, style, and topics, and in length. Fourteen questions to test reading comprehension were available for each set of stories. The questions and answers were in a multiple-choice format and were presented on mimeographed sheets so that a subject had only to circle his answer.

Each of the sets of stories was presented in three different modes: regular sentences, single words, and meaningful phrases. Thus, for example, the regular sentence mode was available using three different sets of stories. Each subject read a different set of stories under each of the conditions; thus, no subject ever read any story more than once. A balanced design was used to control order and sequence of the alternative combinations. A simple apparatus (described below) was used to present the material in each of the conditions.

Each of the three conditions will be described in some detail:

The Regular sentence condition was just that; the words were typed in a regular prose form.

The Single word condition had each word typed separately on a roll of

paper. The apparatus used to present the words made it possible for the words to appear one at a time within a small window.

The Phrase condition presented words in groups, the groupings being determined by a criterion of meaningfulness. Groupings were made on the basis of punctuation, structure, and meaning of the material. The groupings were based primarily on Lefevre's criteria that "the significant elements are grammatical and syntactical structures: noun and verb groups and clusters, clauses, sentences." The largest group of words which could constitute a unit was a sentence, but most sentences were separated into two or more phrases. Two judges each made the phrasings independently and then came to an agreement about each sentence on which they had made different groupings.

An example of each of the three conditions was typed on a 4 x 6 inch card and was shown to each subject while the instructions were being given. The cards appeared as follows:

Regular sentences:
The cow jumped over the moon.

Single words:
The
cow
jumped
over
the
moon.

Phrases:
The cow jumped over the moon.

The single words conditions were typed with triple spacing on 2-1/4 inch wide rolls of white paper (paper typically used in adding machines). The other two conditions were typed with triple spacing on rolls of white paper 8-1/2 inches wide (paper typically used in teletype machines). For the Phrase groupings conditions, the number of word groups per line and the amount of space between groups of words was randomly determined so that the relative position of each grouping varied from line to line.

At the end of each story, a minimal set of instructions (in the regular sentence form) also were presented. The instructions after the first story of each set (the identification task), no matter what the mode, merely said "STOP." After each of the next four stories (the Comprehension task) the instructions were to "STOP - Answer the questions ( ) - ( )."

A simple apparatus was constructed to allow a subject to see one line (or word) at a time in a window. The window was 8-7/8 inches wide and 5/8 inches high and was in the center of a blackboard 12-1/2 inches high and 19 inches wide which was attached at an angle to a solid base. A knob, protruding on the right side of the apparatus and turned by hand, pulled the paper up through the window, thus allowing each subject to regulate the speed with which the material could be read.

2. Procedure

The first story in each set (three stories which were always grouped together) was read aloud by the subject (Identification task). The last two stories in each set were read silently (Comprehension task). Fourteen questions were answered for the three stories in a set.

The following instructions were given in the same order to each subject as he became familiar with the apparatus and procedure:

> I have three different ways of presenting stories. The first form is like this (show card with example of Regular sentence on it). All the words are in a straight line.
> The second form is like this (show card with example of Single word condition on it). The words are separate and you will see them one at a time. The third form is like this (show card with example of Phrase condition on it). The words are grouped together into phrases such that they seem to make sense to go together.
> In each case you are to read the stories to understand them as best you can so that you can answer questions about them. The questions look like this (show mimeo sheets). You circle the correct letter. After you have finished a story, it will say "STOP" - Answer questions one through five," for example; then you answer the questions on here and then go to the next story. You are to turn this knob to regulate how fast you read. You will read the first story out loud and the rest of the stories to yourself. Any questions? O.K. Start when you are ready. (Start stop watch and tape recorder.)

Results and Discussion

Exploration of the data indicated several problems which need be considered before any dicussion of the empirical findings. The most interesting issue concerns the reliability of the standardized reading test scores used in the original assignment of individuals of good and poor reader groups. The

Comprehension scores on the Regular paragraph condition for all four subject groups indicated that almost half (26) of the subjects showed reversed performance, i.e., a good reader (within a particular vocabulary level) had a lower score on the Regular sentence condition than did other readers who had been defined as poor readers; in other words, 13 of the poor readers had high Comprehension scores than their matched good readers. Thus, based on this experimental estimate of current functioning and in contrast to their performance on a similar but previously administered test, almost 50 percent of the subjects could be said to be mis-assigned in terms of their reading (comprehension) level.

Given the observation that the label "poor reader" depended upon which estimate of reading level was being used, it was decided to analyze the data twice. The first analysis used the original estimation of poor reading (i.e., the standard test scores) to group subjects and the second analysis grouped subjects based on current functioning, i.e., their experimental test performance on the Regular sentence condition.

The lack of reliability of standard reading test scores for predicting test performance in experimental situations is consistent with results in other studies (cf., Oakan, 1970 and Cromer, 1968). The implications raised by these indications of unreliability raise concerns about particular standardized reading tests, but also bring into question the results from other experiments which have used such criteria to locate groups of good and poor readers. It seems apparent that more intensive investigation of possible factors contributing to high and low scores on so-called standardized reading tests must be undertaken in the future.

For the analyses which use groupings based on experimental test scores (the revised groupings), subjects were switched within reading levels but each subject was maintained within the same vocabulary level. However, no measure of the reliability of the vocabulary scores was available. It is possible that the vocabulary scores derived from standardized tests also are unreliable, raising the same questions about the reliability of the distinction in vocabulary levels made in our original assignment of subjects. Unfortunately, this problem was not anticipated or observed in time to carry out a reliability check on vocabulary levels.

The results for each individual test will be presented separately, followed by a discussion of the overall correlation among individual tests and a closer look at clusters and patterns among the data. The data will be presented using the standard test score groupings (the original groupings). When differences were found between the results for these subject groupings and the revised groupings, results for the latter also will be presented.

A. Identification Tests

1. Story reading task (Past and Present

The data for each subject consisted of the number of errors (additions, omissions, distortions, substitutions, or verb changes) made on each of the two stories. Only errors not corrected by the subjects were included; that is, if the subject identified a word incorrectly, recognized his error and changed it, his original misidentification was not considered an error.

Results of the analysis of variance on the error scores for the Original subject groupings are shown in Table 2. The poor readers did not differ significantly from the good readers in number of identification errors. The low vocabulary groups combined made significantly more errors ($m = 6.68$) than did the high vocabulary groups combined ($m = 3.86$) ($F = 4.51$, $df = 1/52$, $p < .05$). There also was a significant effect of Tense, with all groups combined making significantly more errors on the present story ($m = 6.07$) than on the past tense story ($m = 4.46$) ($F = 7.02$, $df = 1/52$, $p < .05$). However, there were no significant group by tense interactions. Thus, the effect of changing the tense of the stories did not have a differentially greater effect on any one of the four groups of subjects.

The results of the analysis of variance for the Revised subject groupings were essentially the same as those described above.

2. Identification task (Three Modes of Presentation)

Each subject read one story aloud in the Regular mode, the Single word mode, and the Phrases mode of presentation. The data for this analysis consisted of the number of uncorrected identification errors made by each subject while identifying in each mode.

A summary of the analysis of variance on the total number of identification errors for each subject under each of three modes is presented in Table 3. There were no significant differences between good and poor reader groups combined on the number of identification errors ($F = .14$, $df = 1/52$). However, there was a significant difference between the high vocabulary groups combined and the low vocabulary groups combined ($F = 8.00$, $df = 1/52$, $p < .01$). There also was a significant effect of Mode of presentation ($F = 22.38$, $df = 2/104$, $p < .001$), with the fewest errors occurring for the Single word mode ($m = 4.36$) and relatively greater numbers of errors occurring for the Phrase mode ($m = 7.11$) and the Regular mode ($m = 8.46$). None of the interactions was significant.

The results of the analysis of variance for the Revised subject groupings were essentially the same as those derived from the scores for the Original subject groupings.

Table 2

Analysis of Variance of Identification Error Scores for Good and Poor Reader Groups at High and Low Vocabulary Levels for Past and Present Tense Material

Source	DF	MS	F	p
Total	111	30.70		
Between	55	50.80		
Readers	1	2.29	.05	
Vocabulary	1	222.89	4.51	.05
Reader x Vocabulary	1	.14	.00	
Pooled Individual	52	49.40		
Within	56	10.96		
Tense	1	72.32	7.02	.05
Reader x Tense	1	2.29	.22	
Vocabulary x Tense	1	.04	.00	
Reader x Vocabulary x Tense	1	3.57	.35	
Pooled Individual x Tense	52	10.30		

Table 3

Analysis of Variance of Identification Error Scores for Good and Poor Reader Groups at High and Low Vocabulary Levels for the Three Modes of Presentation

Source	DF	MS	F	
Total	167	32.52		
Between	55	68.18		
Reader	1	8.60	.14	
Vocabulary	1	493.71	8.00	.01
Reader x Vocabulary	1	40.02	.65	
Pooled Individual	52	61.68		
Within	112	15.00		
Mode (Reg-Sin-Phrase)	2	245.21	22.38	.001
Reader x Mode	2	6.60	.60	
Vocabulary x Mode	2	4.36	.40	
Reader x Vocabulary x Mode	2	14.31	1.31	
Pooled Individual x Mode	104	10.96		

3. Comparison with earlier studies

First, with reference to the effect of tense changes on identification, the findings with the seventh grade group are only partially consistent with those obtained with the seventh grade group are only partially consistent with those obtained in Cromer and Wiener's study with fifth graders. In the latter study, the poor readers overall made more identification errors than did the good readers. However, changing Tense had a significant effect only for the poor readers. In other words, the poor readers in the fifth grade made significantly more identification errors on the present tense condition than on the past tense condition. Thus, the poor readers in the fifth grade group responded similarly to the seventh grade low vocabulary group in that they both were significantly effected by Tense.

Second, with reference to the effect of changes in Mode of presentation on identification error scores, the results for the seventh graders are only partially the same as those derived in the study with junior college subjects. At the junior college level, it was found that the poor readers as a group made significantly more identification errors than did the good readers but there were no significant differences between groups with high and low vocabulary levels. Thus, the poor readers at the junior college level responded similarly to the seventh grade low vocabulary group in that they both made larger numbers of identification errors.

These data suggest that there is a high correlation between vocabulary level and identification skills. Two alternative explanations can be offered for this close relationship. It is possible that identification errors are a function of poor vocabulary such that if an individual has a relative vocabulary deficit, he will not be able to recognize (and say) as many individual words. However, it is also possible to argue that a low vocabulary score could be a function of poor identification skills. In this case, a vocabulary test would be seen not only as a test of ability to attribute meaning to particular words, but also requires the subject to identify each word before he could give its meaning. (Actually, an auditory test along with the written form of the wording is required if it is to be considered a reliable method of testing vocabulary, rather than one which confounds word-naming skills with vocabulary.)

Third, with reference to specific effects of changes in modes of presentation, the results show that both junior college and seventh grade subjects made significantly fewer errors on the Single word mode than on the other two. This mode was seen as the condition which best estimates Identification skills (i.e., "word-naming") independent of the effect of comprehension. For the junior college subjects, there was no difference between good and poor reader groups on the Single word mode, thus lending support to the argument that these accomplished readers do not differ in their ability to identify words but differ rather in their organization or understanding of the words they

identify. However, for the seventh graders the low vocabulary group continued to make more errors than the high vocabulary group, even on this Single word mode. Thus, although changing modes of presentation had an overall effect on identification scores, no mode brought the low vocabulary group's performance up to the level of the high vocabulary group.

B. Comprehension Tests

The data in these analyses consisted of: (1) number of questions answered correctly about the story read aloud; and (2) number of questions answered correctly about the two stories read to self. These data were available for each of the three Modes of presentation.

To facilitate a comparison of the scores, each was standardized. Thus, this transformation made all of the scores correspond to distributions with a mean of zero and a standard deviation of one. The data for the aloud condition and for the self condition were first analyzed separately and then were combined. Since the results of each of these analyses were similar, only the results of the combined analysis will be presented. Since the results for the Revised subject groupings were essentially the same as for the Original groupings, the Revised grouping data will be reported whenever these data show additional significant results.

A summary of the results of the anlaysis of variance using Revised subject groupings is presented in Table 4. The difference between the mean number of wrong answers for the poor and the good readers was significant ($F = 15.52$, $df = 1/52$, $p < .001$), with the poor readers giving more wrong answers ($\bar{m} = 5.77$) than did the good readers ($\bar{m} = 4.29$). The difference for the high and low vocabulary levels also was significant ($F = 9.23$, $df = 1/52$, $p < .005$), with the low vocabulary group giving more wrong answers ($\bar{m} = 5.48$) than the high vocabulary group ($\bar{m} = 4.58$). Taking the transformed scores where the means for self and aloud conditions were equal to zero, there was a significant difference ($F = 12.30$, $df = 1/52$, $p < .001$) for the good versus poor readers reading either aloud or to self. The poor readers answered more questions wrong when reading to themselves ($\bar{m} = .26$) than when reading aloud ($\bar{m} = .16$), whereas the good readers answered fewer questions wrong when reading to themselves ($\bar{m} = -.43$) than when reading aloud ($\bar{m} = -.16$). In other words, the good readers appear to comprehend better when reading silently while the poor readers appear to comprehend better when reading aloud.

The differences between the means for Mode of presentation were not significant. However, the Group by Mode interaction was significant ($F = 6.05$, $df = 1/52$, $p < .05$). The poor readers do better on the Phrase ($\bar{m} = 7.86$) or the Single

Table 4

Comprehension, the Number Wrong for Revised Subject Grouping when Read Aloud and to Self for the Three Modes of Reading Presentation

Source	DF	MS	F	p
Total	335	1.0		
Between	55	6.06		
Reader	1	25.36	15.52	.001
Vocabulary	1	15.08	9.23	.005
Reader x Vocabulary	1	3.30	2.02	
Pooled Individual	52	1.63		
Within	280	0.73		
Condition	1	0.00	0.00	
Reader x Condition	1	7.67	12.30	.001
Vocabulary x Condition	1	0.83	1.33	
Reader x Vocabulary x Condition	1	0.01	0.01	
Pooled x Individual x Condition	52	0.62		
Mode	2	0.69	0.92	
Reader x Mode	2	4.54	6.05	.05
Vocabulary x Mode	2	0.14	0.19	
Reader x Vocabulary x Mode	2	0.07	0.09	
Pooled x Individual x Mode	104	0.75		
Condition x Mode	2	0.16	0.23	
Reader x Condition x Mode	2	1.49	2.23	
Vocabulary x Condition x Mode	2	0.45	0.68	
Reader x Vocabulary x Condition x Mode	2	0.53	0.79	
Pooled x Individual x Condition x Mode	104	0.67		

word ($\bar{m}$ = 7.51) mode than on the Regular sentence mode ($\bar{m}$ = 8.89), while the opposite effect was evident for the good readers. The good readers do better on the Regular mode ($\bar{m}$ = 5.61) than on the Phrase ($\bar{m}$ = 6.90) or on the Single word ($\bar{m}$ = 6.39) mode. Thus, comprehension for the poor readers was improved (compared with that on Regular sentences) by changing the mode of presentation, while for the good readers, comprehension was reduced when the mode of presentation was different from typical forms of reading material.

Level of vocabulary skills did not have a significant effect on any of these experimental conditions.

These results on the comprehension test are consistent with those obtained in the study with junior college students. However, in contrast with the seventh grade group, the junior college results also showed a significant Vocabulary Level effect on comprehension scores. In both the present and the junior college studies, the effect of varying modes of presentation was consistently demonstrated for the Revised subject groupings but not consistently for the Original subject groupings. Furthermore, in both studies comprehension for the poor readers was improved (relative to the Regular mode) under the Phrases condition whereas this effect was not found with the good readers. This finding gives further support to the notion that at least some poor readers at the seventh grade level, as well as at the junior college level, are having comprehension difficulties as a function of those subjects not imposing organization on the reading material.

Given this finding, which is discrepant with that found in the study with junior college students, some explanation seems required: (1) although the selection criteria appear to be the same for the two subject populations, they appear to select different kinds of subjects at different grades or at different points in the acquisition of reading skills, or (2) although the criteria select the same kinds of subjects at different grades, these subjects respond differently at different grades or at different points in the acquisition of reading, or (3) both of the above are involved.

C. Word Association data

A score for each individual was arrived at in the following manner. First, the frequency with which each association to a particular stimulus word occurred for all subjects was established. Then, the responses for each subject were scored for the number of associations he gave which occurred with a frequency of 12 or more in the total population. Thus, if a subject gave the association "sit" to the word "chair" he was given a score of one because the association of "chair" to "sit" occurred with a frequency of more than 12. However, if the subject gave the word "comfortable," he received a zero score for that word because this association occurred with a frequency of less than 12. The

subjects' scores for all associations then were totaled for the seven words and this total (which could range from 0 to 7) represented his total word association frequency score.

An analysis of variance computed on the word association scores for the original subject groups (Table 5) showed that there was no significant effect of either Groups or Levels. However, there was a significant Groups x Levels interaction ($F = 4.33$, $df = 1/52$, $p = < .05$). The group with low reading and high vocabulary scores had the lowest number of high frequency word associations ($m = 2.07$). The high reading comprehension and high vocabulary group had the largest number of high frequency associations ($m = 3.29$). The low reading and low vocabulary group ($m = 3.00$) and the high reading and low vocabulary group ($m = 2.86$) scored somewhere inbetween.

The findings on the word association test for the seventh graders are particularly interesting in comparison with the findings from earlier studies. If we look at the results for each of the three subject levels (fifth and seventh grades and junior college), the following emerges. The fifth grade good readers consistently gave higher frequency word associations on this test than did poor readers. For the seventh graders, only those subjects with both high reading comprehension and high vocabulary scores gave higher frequency word associations. For the junior college subjects, there were no significant differences in number of high frequency associations between good and poor readers.

Given these findings, it is possible to argue either (1) that this word association test is not a reliable tool for distinguishing between good and poor readers at different grades or (levels of accomplishment) or (2) with verbal experience, poor readers either learn to respond more consensually or they drop out of school (and hence would not be subjects in a study of poor readers at the junior college level).

D. Cloze Task data

Each subject's score was derived in the following manner. First, all of the word insertions for each space was tabulated for frequency of occurrence. Then, a list was made of all the word insertions that met the following criteria: (1) the word occurred with a frequency of 12 or more for all subjects, and (2) the word was meaningfully and syntactically correct. Each subject was given a score of one for each word that he inserted which met these criteria. The analysis was carried out on the total number of correct, high frequency word insertions given under each condition of presentation, i.e., when the subject read the story to himself or when it was read to him by the experimenter.

Table 5

Consensuality of Word Association Responses based upon Group Frequency of 12 for Good and Poor Readers and High and Low Vocabulary Subjects

Source	DF	MS	F	p
Total	55	1.62		
Reader	1	4.02	2.70	
Vocabulary	1	.88	.59	
Reader x Vocabulary	1	6.45	4.33	.05
Pooled Individual	52	1.49		

Results of the analysis of variance on these scores for the Original subject groups are shown in Table 6 . The good readers made a significantly greater number ($F = 6.12$, $df = 1/52$, $p < .05$) of high frequency word insertions than did the poor readers. There was no significant effect of vocabulary level ($F = 2.26$, $df = 1/52$, $p < .05$) nor were the various interactions significant. However, the condition of presentation (self vs. experimenter) was significant at the .06 level of confidence ($F = 3.91$, $df = 1/52$). For all groups combined, the mean number of correct high-frequency associations under the self-identification condition was higher ($m = 10.14$) than when the experimenter read the material to the subject ($m = 9.63$).

These findings are consistent with those found with fifth graders, i.e., for both populations, the good readers responded more consensually overall than did the poor readers.

Correlation data:

A correlation matrix of all test scores was computed for all 56 subjects combined, that is, using the scores reported above: (1) cloze/self, (2) cloze/experimenter, (3) identification/regular, (4) id/single, (5) id/phrase, (6) comprehension/aloud/reg, (7) comp/aloud/single, (8) comp/aloud/phrase, (9) comp/self/reg, (10) comp/self/single, (11) comp/self/phrase, (12) story reading/past tense, (13) stories/present, (14) word association. All scores used are error scores, i.e., the higher the score the poorer the performance. See Table 7.

The following Pearson product moment correlations can be considered significant at the .01 level.

Cloze/self x cloze/experimenter	.39
Cloze/self x ident/single	-.32
Ident/reg x ident/single	.74
ident/phrase	.71
comp/self/reg	.37
stories/past	.75
stories/present	.68
Ident/single + ident/phrase	.60
comp/self/reg	.43
comp/self/single	.28
stories/past	.56
stories/present	.56
Ident/phrase + stories/past	.46
stories/present	.65
Comp/aloud/reg + comp/self/reg	.39
comp/self/single	.35
Comp/aloud/single + comp/self/single	.44
Comp/aloud/phrase + self/phrase	.31
present/stories	-.28
stories/past	-.28
Comp/self/reg + comp/self/single	.39
comp/self/phrase	.31

Table 6

Consensuality of Cloze Technique Responses Based upon Group Frequency of 12 for Good and Poor Readers and High and Low Vocabulary Subjects

Source	DF	MS	F	p
Total	111	3.04		
Between	55	4.18		
Reader	1	23.22	6.12	.05
Vocabulary	1	8.58	2.60	
Reader x Vocabulary	1	.72	.19	
Pooled Individual	52	3.80		
Within	56	1.92		
Condition	1	7.51	3.91	.06
Reader x Condition	1	.01	.00	
Vocabulary x Condition	1	.01	.00	
Reader x Vocabulary x Condition	1	.22	.12	
Pooled x Individual x Condition	52	1.92		

Table 7

Correlation Matrix for the 15 Variables for all Subject Groups Combined

	Cloze Self Freq=12+	Cloze Exper Freq=12+	Ident Reg	Ident Sin	Ident Phrase	Comp Aloud Reg	Comp Aloud Sin	Comp Aloud Phrase	Comp Self Reg	Comp Self Sin	Comp Self Phrase	Stories Past Tense	Stories Present Tense	Word Assoc Freq-12+
Cloze Self Freq=12+	1.00													
Cloze Exper Freq-12+	.39*	1.00												
Ident Reg	-.23	-.01	1.00											
Ident Sin	-.32*	-.23	.74*	1.00										
Ident Phrase	-.26	-.15	.71*	.60*	1.00									
Comp Aloud Reg	-.03	.05	.10	.22	.08	1.00								
Comp Aloud Sin	-.17	-.14	-.05	-.12	-.18	.15	1.00							
Comp Aloud Phrase	.03	.04	-.25	.01	-.16	.26	.21	1.00						
Comp Self Reg	-.21	-.14	.37*	.43*	.20	.39*	.21	.15	1.00					
Comp Self Sin	-.21	-.12	.10	.28*	-.07	.35*	.23	.11	.39*	1.00				
Comp Self Phrase	-.18	-.09	.10	.17	.03	.19	.44*	.31*	.31*	.29*	1.00			
Stories Past Tense	-.07	-.06	.75*	.56*	.46*	.08	-.04	-.28*	.24	.03	.05	1.00		
Stories Present Tense	-.12	.09	.68*	.56*	.65*	.08	-.02	-.28*	.19	-.01	.04	.70*	1.00	
Word Assoc Freq-12+	.11	.18	.21	.03	.04	-.19	.02	-.13	-.03	-.14	-.04	.19	.30	1.00

*Significance 5% or better

Comp/self/single + comp/self/phrase	.29
Stories/present + stories/past	.69

Also, similar analyses were done for poor reader groups alone and for good reader groups alone. These data appear to be relatively similar to the correlations of all subjects.

Overall, it can be observed that measures of identification skills seem to correlate with each other and, similarly, measures of comprehension skills intercorrelate. However, there were two exceptions to these observations. The first exception was a significant positive correlation between the number of errors in comprehension (when reading to one's self on the Regular paragraph mode) and the number of errors in identification of material in paragraph form (said aloud) ($r = .37$); the second was again a positive correlation between the same comprehension score and material in the single word form (said aloud) ($r = .46$).

E. Individial patterning/cluster analysis

Utilizing three factors, namely, Vocabulary level, response to variations in mode of presentation and consensuality of responses, as indicated by the several subtests (Cloze, word association, past vs. present story identification patterns), eight categories were derived, each of which implied a different type of reading difficulty. These eight categories are the following:

Category	Voc	Effect of Phrasing	Association	Designation
I	Low	No difference	Consensual	Skill deficit problem
II	Low	No difference	Non-consensual	Language deficit
III	High	No difference	Non-consensual	Idiosyncratic responders
IV	High	Difference	Consensual	Word-by-word readers
V	Low	Difference	Consensual	Skill deficit and organizing difficulties
VI	Low	Difference	Non-consensual	Generalized impairment
VII	High	No difference	Consensual	Good readers - require further study of reading problems
VIII	High	Difference	Non-consensual	Idiosyncratic responders and word-by-word readers

Low and high vocabulary were defined in terms of the standard reading test scores available; these levels were assigned as specified in the method section of this paper.

A difference on modes of presentation was defined as occurring when a subject's score was two or more units higher on the phrase condition than on the Regular sentences condition.

Performance on the Cloze test, the word association test, and the story reading test contributed to the consensuality score. Standardized scores were computed for each task. These three standard scores were then added to give a total consensus score. Thus, a subject who gave several high frequency responses on the Cloze task (with the experimenter reading the story), who gave high frequency associations on the word association task, and who made fewer errors on the present tense story than on the past tense story, received a high consensuality score. All subjects who were at least 1.5 standard deviations from the mean on their combined consensuality scores were put into the category "non-consensual."

A number of problems arose when the individual subjects were assigned to each of the above eight categories. The score of some good readers resulted in their being assigned to one of the categories where reading difficulty would be expected. As a result, no apparent sense could be made of the relationship of reading performance to these categories. Using the Revised subject grouping, the patterning of the Revised subjects were somewhat better but there still remained some subjects who, according to the category criteria, would be expected to read less well or better than their reading performance scores indicate.

If each category is examined, the following can be noted:

Category I designates a "skill deficit problem," and includes who have low vocabulary scores, comprehend as well on single word and regular modes as they do on the phrase condition, and show no indications of non-consensual responding.

Six of the subjects in the low vocabulary/low reading comprehension group fell in this category and pose no problems for our understanding of their reading problem. Their problem seems to be limited to that of a deficit in vocabulary skills, and these poor readers could be given specialized help in this area.

Twelve of the sixteen good readers ho had low vocabulary scores (Group Three) also fell within this category. They were pre-selected to be relatively deficient in vocabulary skills and they showed no other evidence of problem areas. They, too, might benefit from vocabulary training; there is no evidence that other types of remedial or developmental assistance could be beneficial.

Category II designates a "language deficit problem," and includes subjects who not only have relative deficiencies in vocabulary skills, but also are non-consensual responders. Their comprehension is not expected to be improved by the pre-grouping of reading material into phrases.

Four of the subjects in the low vocabulary/ low reading comprehension group fell in this category. These subjects appear to have a language problem in that they approach the material idiosyncratically, perhaps attributing personalized meaning in inappropriate ways, which also could account for their relative voabulary deficit.

Only one of the good reader subjects in the good reader, low vocabulary group fell in this category. This subject poses a problem in that given the information available, we are not able to account for his adequate comprehension.

Category III designates individuals who are "idiosyncratic responders." This group, similar to the fourth graders studied earlier, is characterized by a tendency to respond idiosyncratically, but with no other indications of problem areas. Only one poor reader subject fell into this category. The implications are that this subject would have to be evaluated carefully to determine the range of the effect of his idiosyncratic responding and then to intervene with some of the techniques mentioned earlier (Cromer, 1966) concerning possible remediation methods.

Three subjects in the good reading low vocabulary group were found to be idiosyncratic responders. If, as posited, these subjects should have difficulties with reading comprehension as a function of idiosyncratic response patterns, it is not clear why these subjects test as good readers. The finding presents special difficulties for this framework.

Category IV designates individuals who responded as though they were word-by-word readers, but show no indications of having either a deficit in vocabulary skills or of being idiosyncratic responders. Poor readers in this group would be similar to the Difference group studied by Cromer; four subjects in the high vocabulary/low reading comprehension group fell within this category. There is no difficulty accounting for the reading ditficulty for this group, and possible remediation techniques would be similar to those suggested by Cromer (1968).

Three subjects in the good reader category high vocabulary group also fell within Category IV and these subjects pose a problem. These subjects ostensibly do not organize materials to facilitate comprehension, yet seem to be reading (comprehending) relatively well.

Category V designates individuals who have both vocabulary deficit and organizing difficulties, although responding consensually.

Four poor reader subjects fell within this category; they would seem to require a combination of training in vocabulary skills and also could benefit from

remediation techniques which encourage individuals to deal with meaningful groups of words rather than reading word-by-word. However, one good reader subject also fell within this category. At this time we have no adequate means for accounting for this subject, given his score on a reading test which indicates that he reads (comprehends) relatively well.

Category VI designates individuals who are impaired in all three areas of functioning. An individual falling within this category is expected to have great difficulties in comprehension. No subjects fell within this category. It may well be that subjects with this degree of difficulty would show several years of retardation on reading tests and would have been kept back in grade level and thus not be included in this study.

Category VII designates individuals who show no areas of poor performance on the tasks utilized in this study. Any poor reader falling within this category would present a problem for this category system. Clearly, if he has any area of malfunctioning it is not being elicited by the tasks being used to identify them. Five poor reader subjects did fall within this category.

There is no problem accounting for the good readers in Category VII, since such individuals should not have difficulty with reading comprehension. Eight good readers fell within this category.

Category VIII designates individuals who are both idiosyncratic responders and poor organizers but who show no evidence of vocabulary skill deficits. Two poor readers and no good readers fell within this category. The implications for remediation of these poor readers are spelled out earlier.

The category system presented makes it possible to classify reasonably 40 of the 48 subjects. Apparent misclassification of eight subjects, and possibly 13 subjects if Category VII is included, suggests that the model has promise but has problems of a scope which would limit its use at this time. The more general discussion below suggests at least one variable which may need to be included more systematically in the proposed categories; namely, organizational patterning.

Identification, Organization, and Reading Comprehension for Good and Poor Readers

As noted in the general introduction, since comprehension has been used to designate reading difficulty subjects, it is important to explore the relationship of identification and comprehension.

All too often in the literature on reading, much emphasis is placed on the mastery of word identification[1] skills, while the importance of the organizational aspects involved in reading comprehension appears to be overlooked. All too frequently approaches to the teaching of reading, as well as to reading remediation, focus on specific skill deficiencies, particularly on the training of identification skills. In fact, many writers and theorists assume a direct relationship between identification and comprehension and even maintain that identification skills constitute the major antecedent to comprehension. For example in a study of reading achievement among beginning readers, Durrell (1958) concludes that "Most reading difficulties can be prevented by an instructional program which provides early instruction in letter names and sounds, followed by applied phonics and accompanied by suitable practice in meaningful sight vocabulary and aids to attentive silent reading" (p. 5) Gates (1947), while stressing that proficiency in comprehension comes through learning to read in terms of "thought units" (i.e., phrases), goes on to say that: "The ability to read by thought units comes as a natural result of gradually increasing efficiency in recognizing single words.... The deficiency in recognition of thought units grows out of the inadequate development of the techniques of recognizing isolated words and of using context clues (to aid in their recognition)" (pp.335-336).

While the points raised by Gates and by Durell may be applicable to the acquisition stage of reading, many workers appear to assume that comprehension difficulty at any level of reading proficiency is attributable to identification skill deficiency. Although it is clear from the above quotations that investigators recognize the role played by additional activities in reading, the methods typically advocated by them stress heavily the mastery of word identification or "code-breaking" skills, assuming that once these skills are mastered, good reading comprehension will automatically follow.

In contrast to the view which emphasizes a "natural" identification-comprehension relationship, several writers (e.g., Fries, 1963; Lefevre, 1964; Goodman, 1964; Wiener and Cromer, 1967), while recognizing the contribution of a proficiency in identification for the beginning reader, have given more emphasis to the organizational aspects of language which they consider necessary for the achievement of good reading comprehension . As Wiener and Cromer note, some difficulties in reading comprehension can be accounted for in terms of a mismatch between the reader's typical patterns of linguistic organization and the organizational patterns required for the comprehension of the particular written material. It is held that this kind of poor reader has developed language patterns such that his organization and elaboration of the printed language is different from that of the good reader, either because he has not learned a consensual response pattern, or because he has learned an idiosyncratic pattern too well. This formulation implies that either (1) a change in the way in which written material is organized, or (2) a change in one's response

patterns to such material will result in improved reading comprehension. If organization is critical, then the attainment of a high level of identification skills does not necessarily imply a similarly high level of reading comprehension.

Cromer (1968) delineated two groups of readers who performed relatively poorly in terms of reading comprehension. One of these groups had a vocabulary skill deficit; the second was made up of readers who demonstrated adequate vocabulary skills but who were hypothesized to have organizational difficulties. The readers in the second group were assumed to organize their "input" in a linguistically non-relevant way, i.e., they read in a word-by-word fashion rather than organizing input into such "meaningful units" as phrases, and consequently they lose that part of the meaning carried by combinations of words.[2]

One of Cromer's hypotheses was that if reading material were "pre-organized" into meaningful units (i.e., if the graphic forms were arranged in phrases, the level of comprehension of these poor readers would be increased relative to their understanding of reading passages presented in the usual format. As hypothesized, comprehension for this group of poor readers, but not for the vocabulary deficit group, was significantly improved under the "pre-organized" condition. Moreover, with this type of input this group did as well as did a matched group of good readers under any input condition. Cromer also explored his data for the relationship of identification to comprehension and found for these readers, at least, no support of the view that good reading comprehension is a direct function of good identification.

An earlier study by Cromer and Wiener (1966) further suggests that a high level of identification skills may not be a sufficient condition for the occurrence of adequate reading comprehension. In one part of their study, Cromer and Wiener utilized a Cloze technique (Taylor, 1953) whereby words were removed randomly from printed stories. The subjects (matched good and poor readers in the fifth grade) were asked to read these passages aloud and give an appropriate word to fit each blank. The experimenter provided the subject with words he could not identify, corrected any reading errors which were important in the content of the story, and offered an appropriate word whenever a subject indicated he could not supply one for a particular blank. Analysis of the data showed that the good readers as a group gave a significantly greater number of consensually and syntactically correct word insertions than did the poor readers. Insofar as a high degree of accuracy of identification was assured for each good and poor reader alike in the study, and the subjects were guided in their insertions of words by their general comprehension of the stories, this finding is contrary to what would be expected if there were a direct relationship between identification and comprehension for all readers.

In terms of information processing, one's comprehension of a communication, whether in graphic or auditory form, can be considered in terms of the adequacy of the "input" of the message. For purposes of the present analysis, such input may be considered to have two distinct aspects: the "identification" of the words comprising the message and the "organization" of these words into patterns or units. By criteria of consensuality within one's language, both identification and organization in the processing of a communication may be said to be either "good" or "poor." For example, readers who have no difficulty in comprehending written material may be assumed to have "good identification" and "good organization," both of which contribute to "good visual input" when reading. On the other hand, readers showing reading comprehension problems may demonstrate difficulties in identification, in organization, or in both. By this analysis, relatively poor comprehension may occur for a given reader when there is: (a) poor identification and poor organization; (b) good identification and poor organization; or (c) poor identification and good organization.

Thus far the focus in most investigations has been on input within the visual mode. However, comprehension of communications given in the auditory mode also may be analyzed in the above terms. For example, when a story is read aloud to someone, the listener's comprehension is not only a function of his own skills, but also a function of the speaker's skill in identification and in organization. Thus, even though the listener may be an accomplished identifier and organizer himself, he may have some difficulty in comprehending material read aloud by a person who demonstrates (a) poor identification and poor organization, (b) good identidication and poor organization, or (c) poor identification and good organization. In each of these cases "poor auditory input" may be said to occur for the listener.

The present study was designed to assess the relationship of identification and organization to comprehension for both good and poor readers. Both level of identification and patterns of organization were systematically varied to assess their relation to comprehension in both the visual and auditory modes. Four questions were investigated:

1. Although the present authors maintain that a high level of word identification skill is not sufficient for the occurrence of good comprehension for all readers, many workers in the field of reading make, at least tacitly, just such an assumption. The hypothesis that identification training leads to an increase in the comprehension of poor readers can be assumed.

2. While it is commonly assumed that a high level of identification is necessary for good reading comprehension for all readers, it is held that word identification may be a relatively unimportant aspect of reading comprehension

for the more accomplished reader (Wiener and Cromer, 1967). It is hypothesized, then, that if a high level of identification is necessary for the comprehension of good readers, having good readers read under conditions of identification similar to that of poor readers lessens the level of comprehension for these subjects.

By manipulating the level of visual identification while holding constant the organizational patterns of good and poor readers, these aspects of the identification-comprehension relationship can be evaluated.

3. It can be assumed that good and poor readers use differential patterns in organizing input and, if so, then this difference should be manifest in their handling input and, if so, then this difference should be manifest in their handling of material presented auditorily as well as visually. It is hypothesized that the comprehension of both good and poor readers is impaired under conditions of poorly organized auditory input, but that poor readers show a differentially greater degree of impairment under these circumstances.

4. The possibility remains that the difficulty in reading comprehension encountered by the poor reader can be attributed to some deficit or defect which interferes with his comprehension in general, i.e., a condition independent of his attainment of good identification skills and of his patterns of linguistic organization. If this possibility is tenable, and poor readers have some general comprehension difficulty, then comprehension by these individuals of auditorily presented material in which identification and organization is optimal should also be lower than that of good readers under similar good input conditions.

Method

Subjects

Twenth-six boys and twenty-two girls in the fifth grade in a New England public school system served as subjects in the study. Half the subjects were poor readers, reading (i.e., comprehending) on a level at least one and one-half years below grade level, as measured by standardized reading tests administered by the schools. The second group of subjects were reading at or above grade level, and showed no reading comprehension difficulties. A matched-pairs technique was used, with each pair of good and poor readers coming from the same class in school, being of the same sex, and of approximately the same age and intelligence. Half of the good and poor readers participated in Part One of the study, the other half in Part Two. Reading level scores for the poor readers ranged from 2.5 to 3.5 with a mean of 3.25. The reading level for the good readers ranged from 5.0 to 8.8, with a mean of 6.1. Both groups of subjects ranged in age from 9 years 10 months to 11 years 3 months, with a mean age for each group of 10 years 6 months. The intelligence test scores for both groups of subjects, on a fourth-grade Otis test, varied from 90 to 110, with means of 99 and 98 for the good and poor reader groups respectively.

General Procedure

Each subject was tested within his own school building during school hours.

Part One of the study required approximately 20 minutes for each of the good readers; from 30 minutes to an hour was required for each of the poor readers, depending upon the amount of identification training necessary. Part Two of the study required approximately 25 minutes for both the good and poor readers. The order of all presentations was fully counterbalanced.

Efforts were made to maintain an informal situation and to put each of the children at ease. Each child was told that what he was to do had no bearing on his grades or promotion. No child appeared to become upset by any aspect of the experimental procedure, nor was there any evidence that any child was not performing at his best.

Materials and Procedure

The four reading passages used in the study were adapted from standardized reading tests appropriate to the fifth grade level. Comprehension of these passages was measured by five multiple-choice type questions for each story.

Part One of the study was designed to assess the effects on reading comprehension of: (1) improved identification for poor readers; and (2) impaired identification for good readers.

Each poor reader in Part One was given a set of stories to read, presented in the regular prose form, and their comprehension of this material was tested; this provided a base-line measure of reading comprehension for these subjects. As it is generally held that poor readers are deficient in word identification skills, it may be said that these children have "poor visual input" (at least in terms of identification) when reading. This group of poor readers was then trained to identify each individual word occurring in a second set of stories which they were subsequently asked to read. It may be said that with such identification training, "good visual input" (with respect to identification) was provided for the subjects under these circumstances.

For use in the above identification training, four sets of flash cards were made, one for each of the stories. The words appearing in the reading passages were individually typed on these cards. Each poor reader in Part One was trained, using the flash cards, so that he could correctly identify (read aloud) each of the words occurring in the stories he would later be asked to read. The criterion for a subject's having learned the words was a minimum of three successively correct identifications of each word. The more difficult of these words were briefly defined and used in a simple sentence.

As with the poor readers above, the good readers in Part One of the study were given a set of stories to read, and a base-level of comprehension was established

for these subjects. As it is generally held that good readers have adequate identification skills, it is assumed that these subjects have "good visual input" (with respect to identification) when reading such material. The comprehension of these subjects was then tested for a set of passages designed to provide "poor visual input" in terms ot identification. This set of stories was constructed by first tape recording several poor readers in the fifth grade reading the four passages aloud. Typed transcripts of these tapes were then made, including all of the poor reader's pauses, false starts, errors, mispronunciations, omissions, etc.

Part Two of the study was designed to investigate the relationship of identification and organization to comprehension for material presented in the auditory mode.

The comprehension of both the good and poor readers in Part Two was tested for tape recorded passages in which organization was poor. This "poor auditory input" material was recorded by two male and two female poor readers in the fifth grade. Their readings of the four stories were replete with errors: mispronunciations, pauses and false starts, the adding and omission of words. However, each time an error was made, the experimenter corrected the reader, saying the appropriate word(s) aloud. Thus, the proper identification of each word in the stories was made, while the poor readers' generally disrupted and disorganized style of reading remained intact.

Each good and poor reader in Part Two also listened to tape recordings of good readers (i.e., readers good in both identification and organization) reading a set of stories and answered questions measuring their comprehension of these passages. These "good auditory input" recordings were made by two male and two female readers in the fifth grade. Their readings of the four passages were generally quite accurate; the few errors which were made were all self-corrected, and were judged to be insufficient to impair one's comprehension of the material in any way.

Each pair of subjects either read or listened to two of the four passages under the "good input" condition, and the remaining two stories under the "poor input" condition. As there were five questions for each story, a subject could achieve a maximum comprehension score of ten on each "good" and "poor" input pair of stories. The quantitative data for the study consisted of the number of questions answered correctly on each of the two pairs of stories presented to the subjects.

Results

To test the difference between the experimental conditions (auditory vs. visual modes of presentation, and "good" vs. "poor" types of input), an analysis of variance using a Three-Factor "Mixed" Design with Repeated Measures on One

Factor (Bruning and Kintz, 1968) was employed. A summary of the results is presented in Table 8. The good readers answered a significantly greater ($F = 30.16$, $df = 1/92$, $p < .001$) number of questions correctly than did the poor readers. The effect of mode of presentation (i.e., auditory vs. visual) was not significant ($F = 2.42$, $df = 1/92$, $p < .05$). However, the interaction of the good and poor reader groups with the visual and auditory model of presentation (Group x Mode interaction) was significant ($F = 6.61$, $df = 1/92$, $p < .025$). The good readers answered more questions correctly on the stories presented visually ($m = 6.46$) than on those presented auditorily ($m = 5.50$), while no such difference was evident for the poor readers (visual: $m = 4.33$; auditory: $m = 4.83$). The effect of type ot input (i.e., "good" vs. "poor" input) was found to be significant ($F = 9.26$, $df = 1/92$, $p < .005$). Neither the interaction of the good and poor reader groups with the "good" and "poor" types of input (Group x Input interaction), nor the interaction of the visual and auditory modes of presentation with the "good" and "poor" types of input (Mode x Input interaction) was significant (for both interactions, $F = <1$, $df = 1/92$). However, the interaction of the good and poor reader groups, the visual and auditory models of presentation, and the "good" and "poor" types of input (Group x Mode x Input interaction) was significant ($F = 15.98$, $df = 1/92$, $p < .001$). The means for these groups are given in Table 9. An examination of these means shows that the good readers demonstrated their highest level of comprehension under the condition of "good visual input," while the poor readers did best under the "good auditory input" condition. Identification training ("good visual input") did not result in any apparent increase in comprehension for the poor readers. The good readers, however, did perform relatively less well on the "poor visual input" material. While the good and poor readers demonstrated a comparable level of comprehension on the "good auditory input" passages, the performance of the poor readers fell off under the "poor auditory" condition, in contrast to that of the good readers who showed no such trend.

Discussion

The findings of the study lend support to the orgument that an appreciable amount of the poor reader's comprehension difficulties may be attributable to the manner in which he organizes his input. No support was found for the assumption of a direct relationship between identification and comprehension for any group of readers.

The hypothesis that if reading comprehension is a direct function of identification, then training poor readers to identify all the words found in stories they are subsequently asked to read should lead to a higher level of comprehension for this material (relative to their comprehension of similar passages not prefaced by such training) was tested. No appreciable improvement in comprehension was found for the poor readers who received such identification training. Thus, it was not demonstrated that good identification is a sufficient condition for good comprehension for all readers.

Table 8

Analysis of Variance of Number of Questions Correctly Answered by Good and Poor Readers Under Conditions of Auditory Versus Visual Modes of Presentation and Good Versus Poor Types of Input

Source	DF	SS	MS	F	
Between subjects	95	406.8			
Group (G)	1	93.5	93.5	30.16	.001
Mode of Presentation (M)	1	7.5	7.5	2.42	NS
G x M	1	20.5	20.5	6.61	.025
Error	92	285.3	3.1		
Within subjects	96	222.0			
Type of Input (I)	1	17.5	17.5	9.26	.005
G x I	1	0.1	0.1	1	NS
M x I	1	0.0	0.0	1	NS
G x M x I	1	30.2	30.2	15.98	.001
Error	92	174.2	1.89		
Total	191	628.8			

Table 9

Mean Number of Questions Answered Correctly, Group x Mode x Input Interaction

Poor Readers				Good Readers			
Auditory		Visual		Auditory		Visual	
Good	Poor	Good	Poor	Good	Poor	Good	Poor
5.33	4.33	4.42	4.25	5.29	5.71	7.29	5.63

The hypothesis that under conditions of impaired identification the comprehension of good readers would be less than that for similar material presented under normal conditions was supported. The level of comprehension of the good readers fell off markedly under the "poor visual input" condition.

Thus, while the results from Part One of the study tend to confirm the observation that poor identification (at least when confounded with poor organization) is associated with poor comprehension, the contention that good identification is invariably related to good comprehension was not substantiated.

Only partial support was found for the hypothesis that the comprehension of both good and poor readers is impaired under conditions of "poor auditory input" (poorly organized material). While the poor readers did show a lower level of comprehension for this condition, relative to good auditory input, the level of comprehension of the good readers did not decrease. Thus, it would appear that the comprehension of the poor readers suffered under conditions of poorly organized auditory input, while that of the good readers was not effected to any significant degree.

There was no support for the hypothesis that if poor readers have some general deficit in comprehension, then their comprehension of material presented auditorily is lower than that of good readers for the same material. Good and poor readers appear to perform equally well on the "good auditory input" material.

The findings of the study may be interpreted within one framework of reading difficulty suggested by Wiener and Cromer (1967) which also includes a linguistic analysis of reading.

According to Wiener and Cromer's "Difference Model," problems in reading comprehension may be a product of the manner in which the reader organizes his input: there is a mismatch between one's typical modes of responding to written material and the patterns of responding assumed necessary for adequate comprehension to occur. In terms of this model, therefore, a reader who is skilled in word identification may still exhibit comprehension difficulties if he does not organize his reading input into certain patterns.

Considerable support is given to the Difference Model by modern linguistic analyses of reading. Workers such as Fries (1963) and Lefevre (1964) point out that while the majority of current approaches to reading methodology focus on the word as the most significant meaning-bearing unit, linguistically, the word is considered a relatively minor language unit. Lefevre states that many poor readers miss patterns of meaning in the material they read because they miss the meaning-bearing patterns of language: "If they do not literally read word-by-word, they

often read by arbitrary word groups or sentence fragments that make almost as little sense as isolated words called out one at a time.... All these structural errors cause failures in comprehension, since meaning cannot be reached except through the structures that carry meaning" (p. 23). Both Lefevre and Fries maintain that the pattern of intonation constitute one of the most significant systems by which meaning is signaled in language. Often these patterns of pitch, stress, and pauses furnish the minimum contrasts that identify and separate the particular meanings of a communication. Fries relates this to the reading process as follows:

> On the whole, contrary to the beliefs of many, written material contains less of the language signals than does talk. In the graphic representations of language there are left out such language signals as intonation and stress and pause.... If one is to read with comprehension the graphic representations of the language signals, he must learn to supply these portions of the signals which are not in the graphic representations themselves. (p. 130)

The assertions of the Difference Model and of the linguistic analysis of reading provide a means by which many aspects of the present study may be understood.

It was found in Part One of the study that for poor readers, identification training was not sufficient to improve reading comprehension. Following a linguistic analysis, it can be noted that printed material is "pre-organized" only with respect to features of punctuation--it is entirely up to the reader to supply all other aspects of organization which mark and signal the particular meanings carried by the communication. Thus, even if they receive identification training, if poor readers typically do not organize their input into certain efficacious patterns, they may have considerable difficulty understanding what they read--good identification is then not directly related to good comprehension under such circumstances.

A similar interpretation may be made for the findings in Part Two of the study. When listening to material in which the words were both well-identified and well-organized, poor readers demonstrated a level of comprehension that was fully comparable to that of good readers for the same material. In this case, even if they are assumed to be generally deficient in their own abilities to organize, or if they typically organize "differently," the high level of organization imposed on the material by the readers of the passages may have proved sufficient to guide the comprehension of the poor readers. When listening to the "poor auditory input" stories, in which organization was poor, the good readers showed as high a level of comprehension as they did for the "good auditory input" material, while the comprehension of the poor readers markedly decreased. This finding seems to imply that the good readers impose order on their input; the response patterns of the poor readers, however, did not appear to be sufficient to compensate for the lack of proper organization of the material.

One unexpected finding in the study was that the good readers demonstrated a higher level of comprehension for the "good visual input" material ($\bar{m} = 7.29$) than for the "good auditory input" passages ($\bar{m} = 5.29$). If Fries is correct in stating that written material contains fewer language signals than does talk, one would have expected the good readers to have shown their highest level of comprehension on the "good auditory input" passages. One possible explanation for this is that the subjects had differing amounts of exposure time to the visually and auditorily presented stories. When reading the passages themselves, the subjects may have been able to go over words and sentences as many times as they required; when listening to the taped stories, however, they could only hear a single presentation of the material.

Perhaps the most general implication of the present study is related to the teaching of reading. While it was seen that poor identification could be a precursor to poor comprehension, there was no evidence in the study which would support the contention that good identification is systematically related to good comprehension for all readers. This would suggest that for a certain class of reader, methods of instruction which primarily emphasize word identification skills are not sufficient for the development of a high level of reading comprehension. In fact, this focus upon the word may impede the imposition of organization even after identification skill is mastered. Thus, any method of reading instruction which first emphasizes word-by-word identifications, and only later, if at all, comprehension (as do many contemporary approaches) may itself discourage the process of organizing input into the meaningful units which guide one in understanding what has been read.

In a recent study, Cromer (1968) demonstrated that readers who have not adequately learned to deal with written material in terms of meaningful patterns or organization can be encouraged to do so, without extensive training, by the simple method of grouping the material for them. Although Cromer's study involved relatively accomplished readers, this technique of pre-organizing reading materials may also prove to be beneficial for the beginning reader as well. A more thorough approach to the teaching of reading might involve, in addition to the training of identification skills, the use of books in which the contents were printed in pre-organized word groupings, and listening sessions in which the organizational units of good readers were emphasized. Above all, a child should be taught that words derive part of their meaning within the patterns and groupings in which they occur, and instruction as to the means of attending to such organizational cues has to be included as an integral part of and co-jointly with the teaching of all reading skills.

The Effects of Comprehension Training on Identification Tasks for Poor and Good Readers

Reading can be considered as an "identification" activity ("saying" the words aloud) or it can be considered as a comprehension activity in which the primary goal

meaning." Unfortunately, much of the reading literature fails to define adequately which (or both) of these activities is meant by reading. As Wiener and Cromer (1967) have noted, discriminating between identification and comprehension becomes important if we are: (1) to know which behaviors to assess as critical in reading (however defined); (2) to separate reading problems from language problems, intelligence factors, organic defects, etc.; (3) to assess the relationship between identification and comprehension.

Some reading experts (Gates, 1947; Durrell, 1958) apparently assume that identification of the individual word is the key to good reading. According to this view, once the child learns to identify all the words he is likely to encounter, comprehension will follow almost automatically. This view seems to hold, then, that a reader without special training will end by grouping words into critical syntactic units. Thus, it is assumed that identification and comprehension are highly correlated.

On the other hand, some investigators (Wiener and Cromer, 1967; Oakan, Wiener, and Cromer, in press; Fries, 1963; Lefevre, 1964; and Gleason, 1965) argue convincingly that the relationship between identification and comprehension is rather tenuous. While some evidence exists that poor identification may be correlated with poor comprehension, good readers seem to comprehend less well with "poor" visual input; that is, research points to a rather minimal relationship between good identification and good comprehension, i.e., many readers who can identify passages perfectly show very inadequate comprehension.

If comprehension is considered to be somewhat independent of identification, it is ncessary to examine the identification process to determine in what ways misidentifying can take place, both in single word and multiple word situations. Kempler and Wiener (1963) view identification as an example of perceptual behavior in which the printed materials are scanned to obtain "part cues" or "partial information" which become the basis for discrimination between the various graphic shapes (letters) and to elaborate combinations of these shapes into words, phrases, and sentences. In this model, all perception is thought of as "responding to partial information with the particular response being some function of previously learned co-occurrence probabilities." This paradigm views perceptual response characteristics as a function of the "part cues" processed and the response availabilities of the subject. Thus, as the "cue" situations change in the graphic materials, the response patterns evoked also change.

Since all but the most elementary readers appear to use only part of the available information from the printed page, the probability arises of occasional misidentification as a function of: (1) failure to discriminate the cues; (2) failure to utilize "sufficient" cues; (3) inappropriate elaboration of cues; (4) any combination of the above. A reader might identify the word "BAT" as if it were "RAT," as a

function of faulty cue discrimination (mistaking the "B" for an "R"). A reader who fails to utilize sufficient cues might identify the word "SIX" as if it were "SOX," the "I" not being utilized. A reader who elaborates cues inappropriately might well identify the word "RECEIPT" as if it were the word "RECEIVE." The reader is more likely to have learned a consensual response to the graphic shapes in the word "RECEIVE," and thus may not elaborate the input cues appropriately.

Thus far, cue elaboration for single word situations has been described; however, cue elaboration is also a function of multiple word situations. Cue elaboration should be affected by contextual information. The full range of meanings in a passage feeds back upon the cue discrimination and elaboration processes. A competent reader is quite unlikely to misidentify "BAT" as "RAT" if he has utilized even minimal contextual information which informs him that the passage is about baseball, not about small, furry animals. Thus, the discrimination between "B" and "R" becomes far less critical. In this way, information derived from context reduces the number of "part cues" needed to identify correctly a single word or a reading passage.

If the identification process can be conceptualized as an interactive function of both the particular "part cues" processed and the "response availabilities" of the reader, the question arises as to the differences between good and poor readers in regard to learned response patterns. Cromer and Wiener (1966) found evidence to support the idea of idiosyncratic response patterns among poor readers, that is, poor readers elaborate cues differently than do matched good readers. Without inferring any pathology notion, they argued that poor readers either have failed to learn consensual response patterns or learned idiosyncratic response patterns too well. They found that poor readers gave more idiosyncratic responses in several different experimental situations; they gave less consensual responses on word association tasks and on a Cloze procedure in which words are randomly removed from a story and the subject must substitute contextually and syntactically appropriate words.

Apparently, the "poor reader" group either has not sufficiently acquired the signalling patterns inherent in the syntax of the language or for some reason fails to make use of these patterns,[3] for these readers typically provide less syntactically appropriate substitutions. Furthermore, poor readers appear to benefit less from contextual cues. It seems as if the poor reader is forced to make a response in the Cloze procedure from a vastly greater word repertoire than for the good reader. On the other hand, the good reader is able to delimit the response possibilities, utilizing both syntactic cues (e.g., he provides a verb-class form instead of a noun-class form) and contextual cues (e.g., he knows that the story is about hunting, and so seems to limit his verb choice to that context).

In the scanning process which takes place in identification, the question of organization of cues arises. Since the reader cannot take in all cues and process them adequately without slowing his reading speed to a "crawl," he must utilize a system

which enables him to correctly identify graphic materials with the fewest possible cues. As mentioned earlier, the identification process is also dependent on the use of "meaning" cues. It is the meaning or contextual cues which reduce the response possibilities, thus necessitating fewer "part cues" for accurate identification.

One of the primary techniques for retaining this stream of meaning is "chunking," or grouping multiple cues into single, larger units (phrases, clauses). In terms of information processing, the more "bits" (words) a reader can fit into each chunk, the easier he can hold the reduced number of chunks in storage for processing. In addition, with no grouping of words into larger units, the poor reader is more likely to lose the feedback advantage of context and meaning cues because meaning is carried primarily by phrase units and not by individual lexical items (words).

The present study, then, is concerned with exploring various possible relationships between comprehension and identification. Wiener and Cromer (1967) point out four different ways in which comprehension (language skills and knowledge of context) potentially aids the identification process: first, knowledge of language structure (Chomsky, 1957) decreases the possible number of appropriate response possibilities by limiting the response to a given form class or function group; second, the context of a passage delimits the response possibilities (when the reader knows the passage is about "hunting," he can eliminate other response areas); third, knowledge of language structure and context can greatly increase reading speed by decreasing the number of informational units which need to be processed; fourth, knowledge of structure and context provide a possible source of feedback for correcting errors, that is, the reader may experience incongruity between what he hears himself say and what he "knows" to be necessary to fit the relevant context and structure of the given passage being read.

A primary question raised by this study is whether poor readers, who do not appear to use contextual cues, can be aided in the identification process by giving them supplementary contextual information. It has been demonstrated that certain types of poor readers do not organize reading materials into efficient syntactic groupings, and thus lose many essential language cues that aid both the identification and the comprehension process. Furthermore, in failing to utilize these cues, poor readers do not comprehend on a level with good readers. In failing to comprehend as they move through a passage, poor readers must lose much of the context of the reading passage. Losing these contextual cues, they are at a still greater disadvantage in the identification process, for contextual information can greatly reduce the number of cues required for correct identification.

In summary, if the problem for poor readers is primarily a failure to extract cues, it is expected that giving them supplementary contextual information (comprehension training) should lower their identification error rates. Good readers given

contextual information would be expected to show only marginal reduction in identification error rates since it is assumed that they already utilize contextual cues as they read.

It is hypothesized that giving contextual information would enable the reader to correct more of his identification errors spontaneously, utilizing context cues as a feedback mechanism. Finally, the study examines the question of the effect of contextual information on a single word mode of presentation and a paragraph mode of presentation.

To test these questions, a "good" reader group and a "poor" reader group were chosen. Each subject read aloud (identification) under four conditions: a single word presentation with no comprehension training; a single word presentation with comprehension training; a paragraph presentation with no comprehension training; and a paragraph presentation with comprehension training. Results and implications are discussed in the body of the paper.

Method

Subjects

Subjects for the study were 24 poor readers and 24 good readers in the fifth grade of a New England Public School System. The poor reader group consisted of 13 boys, 11 girls reading at least 1-1/2 years below grade level as measured by standardized reading tests (see previous study for details); the good reader group consisted of 13 boys, 11 girls reading at or above grade level as measured by the same reading tests. A matched-pairs design was used, with each "good-poor" reader pair matched for school, class, sex, and approximate age and I.Q. Reading test scores for poor readers ranged from 2.5 to 3.5, the mean being 3.28. Reading scores for good readers ranged from 5.0 to 8.1, the mean being 6.0. Ages for both groups ranged from 10 years 4 months to 12 years 3 months, the mean for both groups being 10 yearss 11 months. I. Q. scores for both groups ranged from 90 to 110, the mean for poor readers being 97-08 and for good readers 99.20.

General Procedure

Subjects were tested individually in their schools. Good readers averaged 25 minutes for testing, and poor readers 40 minutes. Anxiety was minimized by telling all subjects that this was part of a project to obtain information which could be used to write better textbooks.

Materials and Procedures

Four stories from fifth grade supplementary textbooks were used. Two forms were employed: a regular paragraph form on 8-1/2 x 11 paper; a "word-by-word" from

(single word) typed on adding machine paper. This second form of the stories was placed on a machine which the subject "unrolled," with only one word at a time visible.

The four stories were comparable in length (101 to 104 words). For each story a summary with minimum repetition of words to avoid prior identification was used to provide comprehension training. Thus, on comprehension trials, subjects first heard the summary, then read the story. Stories were recorded and analyzed by separate persons for identification errors.

All subjects read the same four stories, each story being read under one of the four experimental conditions.

Each story was paired equally with each condition, and sequential effects were balanced as far as possible. All poor readers read under exactly the same conditions (sequence and story-condition pairing) as their matched good readers.

After a short orientation by the experimenter, each child was given the following directions:

> I would like you to read four stories out loud for me. Each one is pretty short, and you can take your time. With two of the stories, I'm going to tell you something about the story ahead of time. That way you'll have a good idea of what the story is about before you read it. And two of the stories you're going to read from this machine. It works like this: (Child is shown how machine works). Now, with this first story, ... (directions at this point varied, depending on the condition under which the child was reading).

Directions for different conditions:

Condition 1: With this story, I'm just going to have you read it from a regular piece of paper, like you would at school. You're going to find words like...(same words as those repeated from the summary used for comprehension training were given). Just read it as well as you can.

Condition 2: With this story, I'm going to have you read it from the machine. I've shown you how the words come up one at a time when you turn the crank as fast or as slow as you like. (You're going to find words like...). Read this story out loud for me, as well as you can.

Condition 3: With this story, I'm going to tell you ahead of time what is in the story so you'll know what the story is about (summary of story is read to the child). Now I'm going to read it once more for you, so you have a good idea of what the story is about before you read it (summary is read a second time). Now I want you to read it from this sheet of paper. Just read it as well as you can.

Condition 4: (Directions for this condition are a combination of the first part of condition 3, and the first part of condition 2, dealing with the comprehension training and reading by machine.)

All errors not spontaneously corrected by the subject were corrected by the experimenter after the subject had either moved ahead at least two words past the source of the error or hesitated 10 seconds on a word. This was to prevent sequential effects from false output by the subject; it also controlled for repetition of the error when the same word was encountered later in the story.

Results

The data consisted of the identification errors for each subject under each of the four conditions, analyzed in three categories: initial errors; corrected errors (errors spontaneously corrected by subject); and uncorrected errors (initial minus corrected errors). To control for error rate, the corrected errors were scored as the number of corrected errors over the total (initial) errors. These ratio scores were then transformed to normalize the data. Analyses of variance for repeated measures were carried out for each of the three error categories.

Table 10 lists results of the analysis of variance for the initial errors. The poor readers made significantly more initial errors than the good readers ($F = 69.32$, $df = 1/23$). Modes of presentation was significant ($F = 18.64$, $df = 1/23$), more errors being made in the paragraph mode than in the single word mode. The Level x Training interaction gave significance value at the .06 level ($F = 4.13$, $df = 1/23$). All significant means are summarized in Table 13. Error rates for good readers increased with comprehension training, with no significant change for poor readers. Also, the Training x Presentation interaction was significant ($F = 6.80$, $df = 1/23$). With the paragraph mode, error rate rose with comprehension training; conversely, with the single word mode, error rate dropped with comprehension training. The effect for comprehension training was not significant ($F = .09$, $df = 1/23$). Neither the Level x Presentation interaction ($F = 1.16$, $df = 1/23$) nor the Level x Training x Presentation interaction ($F = 1.45$, $df = 1/23$ was significant).

Table 10

Analysis of Variance of Initial Identification Errors for Good and Poor Readers Under Conditions of Comprehension Versus no Comprehension Training and Paragraph Versus Singie Word Modes of Presentation

Source of Variation	DF	MS	F	P
Between Subjects	23	51.99		
Within Subjects	168	30.87		
Good vs. Poor Readers (L)	1	2867.52	69.32	.001
Error	23	41.37		
Comprehension vs. No Comprehension (T)	1	1.02	.09	NS
Error	23	11.67		
Paragraph vs.Single Word (P)	1	168.75	18.64	.01
Error	23	9.05		
L x T	1	27.00	4.13	.06
Error	23	6.54		
L x P	1	11.02	1.16	NS
Error	23	9.43		
T x P	1	46.02	6.80	.025
Error	23	6.76		
L x T x P	1	6.75	1.45	NS
Error	23	4.64		
Total	191	33.41		

The results of the analysis of variance for corrected error ratio scores are presented in Table 11. Comprehension training versus no comprehension training resulted in significantly more corrected errors ($F = 14.73$, $df = 1/23$). The Levels x Training interaction was also significant ($F = 11.26$, $df = 1/23$). In sum, the correction rate for good readers rises significantly with comprehension training; however, for poor readers comprehension training has no significant effect on correction rate.

Neither Level (good versus poor readers) ($F = 1.85$, $df = 1/23$) nor Presentation (paragraph versus single word) ($F = .00$, $df = 1/23$) was significant. Finally, the Level x Presentation interaction ($F = .10$, $df = 1/23$), the Training x Presentation interaction ($F = .82$, $df = 1/23$), and the Level x Training x Presentation interaction ($F = .33$, $df = 1/23$) were not significant.

Results from the analysis of variance for uncorrected errors are shown in Table 12. Poor readers made significantly more errors than good readers ($F = 63.45$, $df = 1/23$). Paragraph mode resulted in significantly more errors than single word mode ($F = 18.45$, $df = 1/23$). Finally, the Training x Presentation interaction was significant ($F = 4.88$, $df = 1/23$). With the paragraph mode, error rate rises with comprehension training; conversely, with the single word mode, error rate drops with comprehension training.

There was no significant difference attributed to training (comprehension versus no comprehension) ($F = .19$, $df = 1/23$). The Level x Training interaction ($F = .76$, $df = 1/23$), the Level x Presentation interaction ($F = 1.70$, $df = 1/23$), and the Level x Training x Presentation interaction ($F = 1.22$, $df = 1/23$) were not significant.

In summary, good readers perform considerably above poor readers in the identification process, both in initial error rate and in uncorrected (final) error rate. Interestingly, good readers make significantly more identification errors when given comprehension training, with poor readers showing no significant effect. Both good and poor readers make significantly fewer errors with a single word mode than with a paragraph mode of presentation. Finally, comprehension training seems to aid the identification process with the single word mode, but seems to hinder (increases the error rate) the identification process with the paragraph mode.

Discussion

The results of this study do not support the notion that these poor readers fail to use contextual information simply because they cannot pick out contextual cues during the reading process. Rather, the results indicate a more fundamental problem for some poor readers. It appears that they not only fail to extract contextual cues essential for identification, but also fail to utilize such cues in identification even when presented with them. They seem to be identifying words as if the words were unrelated items unaffected by syntactical or contextual relationships.

Table 11

Analysis of Variance of Corrected Identification Error Ratio Scores for Good and Poor Readers under Conditions of Comprehension Versus No Comprehension Training and Paragraph Versus Single Word Modes of Presentation

Source of Variation	df	MS	F	p
Between Subjects	23	5.54		
Within Subjects	168	0.63		
Good vs. Poor Readers (L)	1	1.82	1.85	NS
Error	23	.98		
Comprehension vs. No Comprehension (T)	1	4.35	14.73	.01
Error	23	.30		
Paragraph vs. Single Word (P)	1	.00	.00	NS
Error	23	.52		
L x T	1	2.69	11.26	.01
Error	23	.24		
L x P	1	.07	.10	NS
Error	23	.68		
T x P	1	.71	.82	NS
Error	23	.87		
L x T x P	1	.19	.33	NS
Error	23	.56		
Total	191	.67		

Table 12

Analysis of Variance of Uncorrected Identification Errors for Good and Poor Readers under Conditions of Comprehension Versus No Comprehension Training and Paragraph Versus Single Word Modes of Presentation

Source of Variation	df	MS	F	p
Between Subjects	23	48.53		
Within Subjects	168	26.40		
Good vs. Poor Readers (L)	1	2436.75	63.45	.001
Error	23	38.40		
Comprehension vs. No Comprehension (T)	1	1.69	.19	NS
Error	23	8.90		
Paragraph vs. Single Word (P)	1	123.52	18.45	.01
Error	23	6.69		
L x T	1	4.69	.76	NS
Error	23	6.14		
L x P	1	11.02	1.70	NS
Error	23	6.48		
T x P	1	33.33	4.88	.05
Error	23	6.83		
L x T x P	1	6.75	1.22	NS
Errors	23	5.53		
Total	191	29.06		

Table 13

Mean Number of Identification Errors for all Significant Conditions

Initial Errors

Overall Means

Good Readers	Poor Readers	Single Word	Paragraph
2.59	10.32	5.52	7.40

Good Readers		Poor Readers	
No Comp.	Comp.	No Comp.	Comp.
2.15	3.04	10.63	10.02

Paragraph		Single Word	
No Comp.	Comp.	No Comp.	Comp.
6.83	7.96	5.94	5.10

Corrected Error Ratio Scores

No Comprehension:	.59
Comprehension	.89

Good Readers		Poor Readers	
No Comp.	Comp.	No Comp.	Comp.
.57	1.11	.61	.67

Uncorrected Errors

Overall Means

Good Readers	Poor Readers	Single Word	Paragraph
1.77	8.90	4.53	6.14

Paragraph		Single Word	
No Comp.	Comp.	No Comp.	Comp.
5.81	6.46	5.04	4.02

These results suggest that poor readers, at least in their reading activity, do not make use of various signal systems in their language. Cromer (1965) has demonstrated that poor readers (a "difference" group) who possess adequate intelligence and vocabulary skills do not comprehend on a level with good readers apparently because they fail to organize reading materials into critical syntactic groupings. The present study shows that they fail in utilizing contextual as well as syntactic cues--at lease in identifying. Further studies are suggested to analyze the exact types of errors commonly made by good and poor readers to try to specify possible difficulties for the poor readers. It seems safe to conclude that reading difficulties encompass the entire range of language signalling devices, and not just problems of identifying individual lexical items.

It was hypothesized that good readers will show marginal improvement in identification error rates when given supplementary contextual information. Since it is assumed that good readers typically extract contextual cues as they read, supplementary context cues for these readers should be largely redundant. However, the results show a large increase in "initial" error rate for good readers when given comprehension training. Thus, good readers respond significantly to comprehension training, but seemingly in the wrong direction.

It is conceivable that many of the good readers were "put off" by the comprehension training. They were given information (the summary used for comprehension training) enabling them to ignore, and thus to misidentify, many of the "part cues" they ordinarily would have had to search for.

The good readers seemed to minimize the identification task on the comprehension trials, perhaps because identifying became irrelevant for them once they had gained comprehension. Good readers seemed to be "saying": "gaining meaning" is the goal of reading; we have already gained meaning through the comprehension training; therefore, identifying the individual words is a "meaning-less" task.

These results can also be viewed in terms of differential "set" resulting from the task directions. When the good reader was asked simply to read out loud, he probably adopted an "identification" set. But when given comprehension training, the reader was told twice what the story was about (the meaning of the story) before being asked to read it. These instructions may well have created a "comprehension" set, at the expense of the identification task. Apparently, however, only the good readers could reverse this set, for the poor reader group showed no significant change with comprehension training. The implication may well be that many poor readers are "locked in" on identifying individual words as the primary goal in the reading process.

Results support the concept of contextual information as a useful feedback mechanism which enables the reader to correct a significant portion of his errors. More importantly, results show that good readers utilize this feedback potential, for their correction rate doubles when given comprehension training. In contrast, the poor readers failed to utilize even the experimenter's correction of a word when that same word appeared later in the story. Poor readers appeared to be responding to these words as isolated, unrelated items in a series. Good readers, on the other hand, seemed to respond to the words as contextually and syntactically related parts of larger units.

In both initial and uncorrected error categories, comprehension training aided identification in the single word mode; however, comprehension hindered identification in the paragraph mode. Differential comprehension training effects for single word versus paragraph modes might be accounted for in terms of the scanning characteristics of these two modes. A single word mode encourages very complete and relatively slow scanning of cues, and discourages chunking into units. A paragraph mode encourages more rapid and less complete scanning, and "invites" chunking. Apparently, comprehension training aids only the slow, complete scanning, where the identifying task is made primary by destroying the grouping of words through a single word presentation. Where chunking and comprehending are encouraged, as in paragraph materials, identification suffers with comprehension training. Scanning becomes redundant after comprehension training has provided the meaning of the story.

Throughout all the error categories, significantly fewer errors were made in the single word mode. Both good and poor readers did better when reading word-by-word. In terms of the Kempler-Wiener model of perception, this can be explained on the basis of the degree of completeness of the "part cues" available. In the paragraph mode, the possibilities for error, given the same response availabilities are greater than with single word mode, since the reader is scanning and processing a far greater number of units in a given time span. In the single word mode, the "part cues" are virtually complete, that is, relatively all the graphic representations (letters) are processed, leaving little ambiguity, and thus little choice in terms of response possibilities.

The implications for both the teaching of reading and remedial reading are that identification skills are not sufficient for the reading process. In fact, emphasis on identification skills in the teaching of reading may encourage an "identification set" in which the proper "saying" of the word takes precedence over critical skills involved in utilizing the full range of contextual and syntactic signalling patterns embedded in graphic language. Previous work by Wiener and Cromer (1966) and Oakan (in press) suggests similar conclusions. A large class of poor readers fails to organize reading materials into critical groupings and fails to utilize critical contextual cues needed for adequate identification and comprehension.

The question concerning reading problems seems to be this: why should a native speaker have trouble with reading when he has already mastered the full range of complex signalling systems and semantic usages inherent in spoken language? Learning the graphic shapes in reading would appear to be a simple task compared with the formidable job of learning for the first time the complete system of signalling devices in a new language at age two or three. In fact, the assumption by many of direct transfer from auditory to graphic language may lie at the root of the problem. Linguists like Fries (1963) and Gleason (1965) (and the Wiener and Cromer model of reading) point out numerous, critical ways in which auditory language differs from graphic language. Speech utilizes patterns of stress, pause, and intonation as essential, and primary structure guides. Graphic language, at least as it is widely taught, offers no equivalent devices for signalling syntactic and certain semantic functions--functions critical to comprehension.

Spoken and written language, then, differ in crucial ways, and many issues that come under the rubric of "reading problems" may not be resolved until there is recognition of (and techniques for implementing) the "missing" structure signals in graphic language. Current research using the Wiener and Cromer model is addressing itself to a certain of these questions.

General Discussion

In the conceptualization of reading difficulties used here, there has always been a concern with effect of organization on reading comprehension. However, there has been in this proposed model an implicit assumption that the various factors contributing to comprehension, e.g., consensuality of response, vocabulary level, and response to changes in organization, are additive and, therefore, could contribute equally to reading comprehension difficulties. In the light of the findings presented here, it now seems more reasonable to assume a weighted or non-additive model in which the role of organization becomes more important. In the present context, then, the availability of responsiveness to changes in organization, or the imposition of organization on reading material, may determine the relative weighting of other factors in accounting for any reading difficulty.

The present emphasis on organization in language or part of reading seems quite compatible with the emphasis suggested by investigators such as Fries, Lefevre, and Gleason. It is our expectation that this increased concern with the problem of organization in reading will lead to a more fruitful set of categories for distinguishing among types of poor readers.

If the results of the study with seventh graders are compared with findings in earlier studies with fourth graders and junior college students, it becomes even more evident that any attempt to account forreading difficulties must include an explicit consideration of the acquisition-accomplished reader dimension. The

weight of the factors looked for as contributing to reading difficulties would also seem to differ depending on the point in the acquisition at which the reading problem is noted.

The findings in the two studies dealing with the relationship between identification and comprehension, as well as the correlational data in the first study of seventh grade readers also point to the importance of considering language organization patterns in reading. It now seems apparent that any attempt to extend the proposed category system to identify different kinds of reading problems will have to include some measure of variations in the way individuals impose organization on reading materials.

While one study did include a measure of the effect upon the reader of material pre-organized for him, it did not include a measure of individual differences in imposing organization on reading material. If this kind of measure is to be used, there are several possible procedures which could be used. For example, it would be possible to measure the organization, e.g., "chunking" present when a subject is asked to identify words presented singly. Another possibility would be to present a sentence auditorally such that each word received equal emphasis and separated by equal pauses (like list reading) and then measure the amount of chunking included in an oral repetition of the sentence.

Given the findings in the three studies of very limited correlations between identification and comprehension, particularly among poor readers, it becomes even more crucial to articulate all criteria (implicit and explicit) for designating the category"poor reader." More importantly, perhaps, is the replication of an earlier finding (Cromer, 1968) which shows that very little variance in comprehension is accounted for by identification competence.

As noted in each of the previous sections, there are a number of more specific issues, each of which requires extended research. One such major issue is that of criteria for specifying someone has having a reading difficulty (i.e., comprehension). In two separate projects, there was clear evidence that there was a significant number of subjects who were labelled as "poor"readers based on their scores on a standard reading test, but who on an experimental test of comprehension responded as well or better than did several subjects who, by their scores of the same standard test of reading, would be labelled as "good" readers. Careful analysis of the standard reading tests suggested that all too often the"comprehension"question required previous experience or memory more than understanding of the relationship or the meaning of the content.

Similarly, it can be held that vocabulary test scores derived for standard tests are, at least partially, confounded with identification skill of the subjects. All in all, the development of adequate criteria for locating readers who have difficulty seems to be of highest priority.

Footnotes

[1] "Identification" in reading may be defined as the process involving the ability to discriminate among graphic symbols, among auditory symbols (i.e., among words presented both visually and auditorily), and the ability to transform such symbols from a visual to an auditory form. If the products of such a process of identification correspond to one's available auditory language forms, meaning can then be associated with the visual forms. (See Wiener and Cromer, 1967).

[2] In both written and spoken language, meaning is not carried solely by the individual lexical units. A highly significant amount of meaning is delineated by the patterning of individual words into larger structural units.

[3] Fries (1963) conceives of reading as responding as adequately to the full range of "language signals" in the graphic mode as in the auditory mode.

[4] Interestingly, in their study of fifth grade poor and good readers, Cromer and Wiener found no evidence for a general perceptual problem of cue discrimination or elaboration. On non-verbal materials, no differences were found between good and poor readers in discriminating and elaborating geometric and free forms.

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